TEMPORARY INSTRUCTION 2515/169

MITIGATING SYSTEMS PERFORMANCE INDEX VERIFICATION

CORNERSTONE: MITIGATING SYSTEMS

APPLICABILITY: This temporary instruction (TI) applies to all holders of operating licenses for light water nuclear power reactors.

2515/169-01 OBJECTIVE

The objective of this TI is to verify that licensees have correctly implemented the Mitigating Systems Performance Index (MSPI) guidance for reporting unavailability and unreliability of the monitored safety systems.

2515/169-02 BACKGROUND

02.01 Purpose of the MSPI

The MSPI was developed to replace the Safety System Unavailability (SSU) indicators currently in use in the Reactor Oversight Process (ROP). The SSU indicators have several weaknesses, including the following: (1) the use of design basis functions rather than risk-significant functions; (2) the use of thresholds developed from generic plant models rather than from plant-specific models; (3) the use of fault exposure unavailable hours as a surrogate for unreliability rather than monitoring unreliability directly, and (4) the cascading of support system unavailability to the monitored systems rather than monitoring support systems separately. The MSPI monitors the unavailability and the unreliability of the same four safety systems that comprise the SSU; it also monitors the cooling water support systems for those four safety systems. These systems include:

Boiling Water Reactors:

- Emergency AC (emergency alternating current (EAC))
- High pressure injection (high pressure coolant injection (HPCI)/high pressure core spray (HPCS)/feedwater coolant injection (FWCI))

- Heat removal (Reactor core isolation cooling (RCIC/isolation condenser (IC))
- Residual heat removal (RHR)
- Cooling water support systems (Emergency Service Water (ESW) and component cooling water (CCW) or their equivalents)

Pressurized Water Reactors:

- Emergency AC (emergency alternating current (EAC))
- High pressure injection (High Pressure Safety Injection (HPSI))
- Heat removal (auxiliary feedwater (AFW)/emergency feedwater (EFW))
- Residual heat removal (RHR)
- Cooling water support systems (Emergency Service Water (ESW) and component cooling water (CCW) or their equivalents)

2515/169-03 INSPECTION REQUIREMENTS

03.01 General. There are no regulatory requirements for this program and licensee participation is voluntary.

Prior to the April 1, 2006, implementation of MSPI into the ROP, a team of NRC staff and contractors involved in the development of the index, conducted an audit of the licensees' bases documents. On a sampling basis, the team selected key aspects of the index to ensure that the licensees followed the MSPI guidelines. The key aspects included: (1) identification of the correct boundaries; (2) selection of the appropriate components; (3) establishment of baseline unavailability and unreliability information; and (4) resolution of concerns with respect to the individual licensee's Probabilistic Risk Assessments.

The purpose of this Temporary Instruction is to validate the unavailability and unreliability input data and to verify accuracy of the first reporting results for the 2006 second quarter. This Temporary Instruction will be completed by December 31, 2006.

03.02 Credit for Unavailability

a. On a sampling basis, the inspector will review the licensee's list of surveillance activities which, when performed, do not render the train unavailable due to the short duration of the activity (less than 15 minutes).

b. On a sampling basis, the inspector will review the licensee's list of surveillance activities which, when performed, do not render the train unavailable due to the credit for operator recovery activities as defined by Nuclear Energy Institute (NEI)

99-02 (Regulatory Assessment Performance Indicator Guideline), Revision 4, page F-6.

03.03 Verification of Unavailability and Unreliability Data

a. For each MSPI system, using the general concepts discussed in Section 1.2.2 of Appendix F of NEI 99-02, Revision 4, the inspector will independently determine the baseline planned unavailability hours and confirm that these hours were correctly translated into the basis document.

b. On a sampling basis for each MSPI system, using operating logs, corrective maintenance records, and condition reports, the inspector will confirm that the actual planned and unplanned unavailability data is accurate.

c. On a sampling basis for each MSPI system, based on a review of related maintenance and test history, the inspector will confirm the accuracy of the failure data (demand failures, run/load failures, and failures to meet the risk-significant mission time, as applicable) for the identified monitored components.

2515/169-04 GUIDANCE

04.01 General

Although a detailed understanding of how the MSPI index is calculated is not required to conduct this TI, it is important that the inspector becomes familiar with the licensee's MSPI bases document. The inspector should be aware of each system boundary and the components that the licensee will be specifically monitoring under the index. The regional MSPI contacts, as well as training on the MSPI, should aid in this understanding.

04.02 Credit for Unavailability.

a. As discussed in Section G.1.7 of Appendix G of NEI 99-02, Revision 4, the licensee will develop a list of any periodic surveillances or evolutions of less than 15 minutes of unavailability that the licensee will not include in the MSPI train unavailability. The intent of this list is to minimize unnecessary burden of data collection, documentation and verification because these short durations have insignificant risk impact. In many cases, the licensee may state "none" in this section which means that all unavailability resulting from surveillance activities will be counted as train unavailability in the MSPI calculations. For those circumstances where the licensee provides a list in the MSPI basis document, confirmation that the unavailability time is of short duration is necessary. Therefore, on a sampling basis, the inspector should review the listed surveillance activity and verify the duration of unavailability is less than 15 minutes. This can be accomplished based on the inspector's knowledge of the surveillance or a review of the licensee's record keeping on previous surveillances. For example, the licensee may document unavailability in the control room log books. The inspector should review log book entries for a sample of the surveillances to ensure the time period of unavailability is less than 15 minutes.

b. As discussed in Section F.1.2.1 of Appendix F of NEI 99-02, Revision 4, credit for operator recovery actions during testing or operational alignment, or during some maintenance activities can be taken to reduce train unavailability time. The licensee will develop a list of these activities that will not be included in the MSPI train unavailability. With some systems, the licensee may state "none" which means that the system will not realign itself during surveillance activities or operator actions to recover availability do not meet guidelines. For those circumstances where the licensee provided a list in the MSPI basis document, confirmation that the activities meet the guidelines is necessary. Therefore, on a sampling basis, the inspector should review the listed surveillance activity and verify that the operator actions to recover unavailability are contained in a written procedure and are uncomplicated. This can be accomplished based on the inspector's knowledge of the surveillance or a review of the surveillance or operating procedure.

04.03 Entry of Baseline Data

a. Baseline Planned Unavailability: In developing the baseline unavailability for a train or a segment, the licensee will determine the baseline planned unavailability time based on actual plant specific values for the period of 2002 - 2004. These values are expected to remain fixed unless the licensee changes its maintenance philosophy with respect to online maintenance or preventive maintenance. The licensee's calculations for this section will be documented in an Appendix to the MSPI basis document.

The inspector should understand the MSPI system boundaries, particularly the support cooling functions, prior to performing this task. It is important to verify that the licensee has properly accounted for planned and unplanned unavailability resulting from cascading support system inoperability. In most cases, the last valve that connects the cooling water support system to another MSPI system component is included in that MSPI system. Unavailability of this last valve is counted in that MSPI system, not in the cooling water system. In addition, all of the components within the system boundary will contribute to the unavailability time of the system train or segment.

For the cooling water system(s), the inspector will review related work history information, maintenance rule information, corrective action program documents, and surveillance testing to determine periods of time where the licensee planned to make the cooling water system unavailable. On a sampling basis, the inspector should review operating logs and the above information to determine the actual time periods the system was not available due to planned activities. This information should be compared to the licensee's assessment and discrepancies should be resolved.

For the remaining systems, the licensee will calculate the plant-specific baseline planned unavailability using the ROP data from 2002-2004. In general, this information will come from previously submitted SSU information and should be available on the ROP website. Using the process stated in Section 1.2.2 of the NEI guidance, the licensee should have developed tables for each train showing

the values used in their calculation. The inspector should verify that the licensee accurately transposed the SSU information into these tables, specifically,(1) total train unavailability hours reported in the SSU; (2) fault exposure hours which were included in the 2002-2004 data; and (3) unplanned unavailability time. Using information from system health reports, corrective action program documents, and maintenance rule information, the inspector should independently confirm the accuracy of the additions and deletions from this data. For example, on a sampling basis, the inspector will review operator logs and maintenance records as necessary to verify the number of hours the licensee added for planned overhauls which had not been included in the SSU calculation. The inspector will confirm that the planned unavailability time listed in the plant-specific spread sheet did occur and will confirm that planned unavailability time described in the logs/condition reports is counted. It is key that the inspector confirm that the licensee did not double subtract hours. For example, if unplanned unavailability occurred due to low cooling water flow to a pump, the licensee should not subtract these hours in both steps 2 and 7 of the process stated in Section 1.2.2 of the NEI guidance.

The inspector will confirm the licensee's estimated critical hours reported by comparing that estimate with the critical hours reported in the Scrams per 7,000 Critical Hours performance indicator (PI) or the critical hours reported in the monthly operating reports.

The inspector shall verify that the baseline planned unavailability information was correctly translated to the consolidated data entry (CDE) input sheet.

b. Actual Performance Data - Unavailability: The actual performance data covers a 12 quarter period. Because of the overlap with the baseline unavailability time (the 2002-2004 data in the above activity), it is necessary only to verify the data for the 2005-2006 time period in this section.

Because Inspection Procedure 71151, "Performance Indicator Verification," was not performed for the mitigating systems in calendar year 2005, the information presented by the licensee in the SSU needs to be verified. Therefore, the inspector shall first determine the accuracy and completeness of the reported unavailability data by reviewing out-of-service logs, operating logs, and the maintenance rule database. In addition to the review of these records, the inspector should, in conjunction with inspections in other inspectable areas, verify planned, unplanned, or fault exposure unavailable hours for the system under review. Related inspectable areas under which inspectors can review unavailability determinations include equipment alignment, emergent work, maintenance rule implementation, and maintenance work prioritization and control.

Once the accuracy of the SSU information is verified, the inspector should confirm that the licensee accurately determined the MSPI unavailability. The inspector should verify the following information was recorded in the CDE input:

1. For the 2003 and 2004 data, the total unavailability time would include the planned, as determined in section 04.03a of this procedure, and the

unplanned unavailability, which was previously subtracted in step 3 of section 1.2.2 of the NEI guidance.

2. For the 2005 and 2006 data, the inspector should confirm that the licensee did not include any fault exposure hours or unavailability hours while the reactor was not critical.

c. Actual Performance Data - Unreliability: Using Section F.2.2.2 of Appendix F of NEI 99-02, Revision 4, the inspector will verify the licensee appropriately identified the failures of the monitored components. Determination of a failure is defined using the success criteria found in the licensee's basis document. It is important to note that the MSPI success criteria may be less conservative than the licensing bases. For example, the MSPI success criteria may require a flow rate of 450 gpm, whereas Technical Specifications may require 500 gpm. If the surveillance as-found condition is 475 gpm, the pump will be TS inoperable; however, the pump would still be capable of fulfilling its MSPI function.

For each MSPI monitored component, the inspector should gather background information such as condition reports or system health information to determine periods of time in which individual components failed to operate properly. The unreliability component for valves include only failures on demand. The unreliability component for pumps include both failures on demand and failures to meet the risk-significant mission time. The unreliability component for emergency diesel generators include failures on demand, failures to load/run, and failures to meet the risk-significant mission time. On a sampling basis, the inspector should verify that the licensee captured these failures accurately in its documentation.

Discovered conditions of non-monitored components that render the system/train from performing its MSPI stated function, whether originating in the monitored system or not, require special consideration. These situations are covered in detail in the MSPI training slides that can be located under the ROP link on the internal website (Digital City). Situations not covered by the training slide examples should be resolved between the inspector and the MSPI regional contact.

2515/169-05 REPORTING REQUIREMENTS

The results of this Temporary Instruction should be included in Section 4OA4 of an integrated inspection report and should be forwarded to the Region contact person listed in this Temporary Instruction. The following questions and answers should be documented:

1. For the sample selected, did the licensee accurately document the baseline planned unavailability hours for the MSPI systems?

2. For the sample selected, did the licensee accurately document the actual unavailability hours for the MSPI systems?

3. For the sample selected, did the licensee accurately document the actual unreliability information for each MSPI monitored component?

4. Did the inspector identify significant errors in the reported data, which resulted in a change to the indicated index color? Describe the actual condition and corrective actions taken by the licensee, including the date when the revised PI information was submitted to the NRC.

5. Did the inspector identify significant discrepancies in the basis document which resulted in (1) a change to the system boundary; (2) an addition of a monitored component; or (3) a change in the reported index color? Describe the actual condition and corrective actions taken by the licensee, including, the date of when the bases document was revised.

2515/169-06 COMPLETION SCHEDULE

This TI should be completed on or before December 31, 2006.

2515/169-07 EXPIRATION

This TI will expire on December 31, 2006. Before that date, this TI should be performed once at each licensee facility, where applicable.

2515/169-08 CONTACT

For questions regarding the performance of this TI and emergent issues, contact John Thompson (301-415-1011, jwt1@nrc.gov) or Regional Contacts:

Region I	Christopher Cahill	610-337-5108 cgc@nrc.gov
Region II	Walt Rogers	404-562-4619 wgr1@nrc.gov
Region III	Sonia Burgess	630-829-9752 sdb2@nrc.gov
Region IV	Michael Runyan	817-860-8142 mfr@nrc.gov

2515/169-09 STATISTICAL DATA REPORTING

All direct inspection effort expended on this TI is to be charged to 2515/169 for reporting by the HRMS system with an IPE code of SI.

Per memorandum dated January 20, 2006, from Mr. Michael J. Case, Director, Division of Inspection and Regional Support, Office of Nuclear Reactor Regulation to the Regional Deputy Administrators, performance indicators MS01, MS02, MS03, and MS04 will not be inspected during CY 2006 as this Temporary Instruction evaluates equipment availability and reliability data. Therefore, no samples will be included in the RPS inspection tracking system.

2515/169-10 ORIGINATING ORGANIZATION INFORMATION

10.01 Organizational Responsibility

This TI was initiated by NRR/Division of Inspection & Regional Support (DIRS)/Performance Assessment Branch (IPAB).

10.02 Resource Estimate

The direct inspection effort to be expended in connection with this TI is estimated to be 30-40 person-hours for a two-unit site.

10.03 Training

Training on this TI was conducted in the Regional offices during the second quarter of calendar year 2006. Additional support can be obtained through the Regional contacts.

END

Attachment 1

Revision History For TI 2515/169, Mitigating Systems Performance Index Verification

Commitment Tracking Number	Issue Date	Description of Change	Training Needed	Training Completion Date	Comment Resolution Accession Number
	07/25/06	Temporary instruction for conducting MSPI data verifications.	Training was conducted in each of the four regions via a two hour presentation during the regional inspector counterpart meetings.	June 6, 2006	ML060940629